**Syllabus: Anth 192 Developmental Plasticity and Evolution**

**Winter 2013**

**Class Time: Tu/Th 5-6:15 pm**

**Location:** HSSB 1173

**Instructor:** Aaron Blackwell

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**Office:** HSSB 2049

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**Office Hours: Tu 10-11 am; Th 1-2 pm**

**Course Description:**

How organisms develop differently in different environments; how developmental plasticity facilitates evolution; adaptive landscapes; genetic accommodation of phenotypic variation; reaction norms; variation and flexibility in immune function, growth, behavior. Emphasis on humans but with examples and applicability to other species.

**Required Preparation:**

Prerequisite: Anth 5 or Anth 7 with a minimum grade of C; or equivalent preparation in evolution and basic biology from another course (e.g. EEMB 2). Open to non-majors.

**Class Format and Grading:**

The class will be lecture and discussion based. Class attendance and participation in discussions is expected. To encourage attendance, small pop quizzes or homework assignments will be given at least once a week, sometimes more frequently, and you must be in attendance to receive credit. The surprise assignments will often refer to the material in the readings for that lecture day. In addition to the quizzes, there will be a midterm and a final. Both will be composed primarily of short essay questions. The final will be comprehensive.

Grade breakdown is as follows:

Midterm: 25%

Final Exam: 40%

Pop quizzes, surprise homework questions, and class participation: 35% + 5% bonus points

**Readings**

Two books should be purchased:

1. *Evolution in Four Dimensions: Genetic, Epigenetic, Behavioral, and Symbolic Variation in the History of Life* by Eva Jablonka, Marion J. Lamb and Anna Zeligowski (Sep 8, 2006) ISBN: 0262600692 (Also available in a Kindle edition!)
2. Ecological Developmental Biology by Scott F. Gilbert and David Epel ISBN: 0878932992

**EDB: From Ecological Developmental Biology we will read:**

Ch 1. The Environment as a Normal Agent in Producing Phenotypes

Ch 2. How Agents in the Environment Effect Molecular Changes in Development

Ch 3. Developmental Symbiosis: Co-Development as a Strategy for Life (Only read 98-114)

Ch 7. The Epigenetic Origin of Adult Diseases

Ch 8. The Modern Synthesis: Natural Selection of Allelic Variation

Ch 9. Evolution through Developmental Regulatory Genes

Ch 10. Environment, Development, and Evolution: Toward a New Synthesis

Coda: Philosophical Concerns Raised by Ecological Developmental Biology

Appendix A: History

Appendix D: Epigenetic Inheritance

**E4D: From Evolution in Four Dimensions:** Pretty much just read the whole book

**Other materials for this class:**

Video: Eva Jablonka Lecture on Evolution in Four Dimensions: http://videolectures.net/sep09\_jablonka\_eifd/

Phenotypic Evolution a Reaction Norm Perspective

Chapter 3: Reaction Norms and Phenotypic Plasticity (to be posted on Gauchospace)

**Class Schedule**

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| **Week** | **Dates** | **Topics** | **Reading** |
| **1** | 1/8 | Introduction and Overview  Review of Natural Selection / Lamarkism | Read this syllabus! |
|  | 1/10 | Genetic Inheritance  Modern Synthesis  Selfish Gene | E4D Ch 1  EDB Ch 8 |
| **2** | 1/15 | Genotype to Phenotype: transcription, translation, etc | E4D Ch 2 |
|  | 1/17 | Development/Ontogeny  Canalization | EDB Ch 1 |
| **3** | 1/22 | Reaction Norms and Life History | PE Ch 3 |
|  | 1/24 | Regulation of gene expression: methylation, chromatin, promoter regions | EDB Ch 2 |
| **4** | 1/29 | Developmental Effects on Adult Health  Thrifty Genotype/Thrifty Phenotype  Maternal Effects on Obesity, etc | EDB Ch 7: 245-267 |
|  | 1/31 | Ecological Immunology | EDB Ch 3: 98-114 |
| **5** | 2/5 | Review for Midterm |  |
|  | **2/7** | **Midterm!** |  |
| **6** | 2/12 | Evolutionary Change through Development | EDB Ch 9 |
|  | 2/14 | Epigenetics | E4D Ch 4, EBD Appendix B |
| **7** | 2/19 | Epigenetics and Disease | EDB Ch 7: 267-283 |
|  | 2/21 | Epigenetic Inheritance | EDB Appendix D |
| **8** | 2/26 | Behavior and Behavioral Inheritance | E4D Ch 5 |
|  | 2/28 | Evolving Behaviors and Plasticity: Genetic Assimilation and Accommodation | EDB Ch 10, E4D Ch 7 |
| **9** | 3/5 | Adaptive Landscapes: Plasticity and Speciation, Hidden Genetic Variation |  |
|  | 3/7 | Cultural Inheritance | E4D Ch 6 |
| **10** | 3/12 | Culture Gene Co-evolution | E4D Ch 8 |
|  | 3/14 | Wrap-up and Review for Final |  |
| **Final** | Wed 5/20 | **Final Exam: 7:30-10:30 pm** |  |